

What is claimed is:

1. A statistical method for recommending items to users in one or more groups of users comprising:

maintaining user-related data including storing a history of ratings of items by users in the one or more groups of users;

computing parameters associated with the one or more groups using the user-related data, including for each of the one or more groups of users computing parameters characterizing predicted ratings of items by users in the group;

computing personalized statistical parameters for each of one or more individual users using the parameters associated with said user's group of users and the stored history of ratings of items by that user;

enabling calculation of parameters characterizing predicted ratings of the items by the each of one or more users using the personalized statistical parameters.

2. The method of claim 1 wherein the one or more groups of users include cohorts.

3. The method of claim 2 wherein the cohorts include demographic cohorts.

4. The method of claim 3 wherein the demographic cohorts are defined in terms of one or more of age, gender, and zip code.

5. The method of claim 2 wherein the cohorts are specified by user characteristics including preferences to types of films.

6. The method of claim 5 wherein the preferences to types of films include preferences to one or more of independent films and science fiction films.

7. The method of claim 2 wherein the cohorts include latent cohorts.

8. The method of claim 7 wherein the cohorts are specified in terms of demographics.

9. The method of claim 8 wherein the cohorts are further specified in terms of item preferences.

10. The method of claim 7 wherein the assignment of users to the latent cohorts are probabilistic.

11. The method of claim 10 wherein at least some users are assigned to multiple cohorts.

12. The method of claim 1 wherein the items include television shows.

13. The method of claim 1 wherein the items include movies.

14. The method of claim 1 wherein the items include music.

15. The method of claim 1 wherein the items include gifts.

16. The method of claim 1 wherein calculation of the parameters characterizing the predicted ratings includes calculation of an expected rating.

17. The method of claim 1 wherein calculation of the parameters characterizing the predicted ratings includes calculation of parameters associated with risk components of said ratings.

18. The method of claim 1 wherein calculation of the parameters characterizing predicted ratings includes calculation of parameters characterizing risk-adjusted ratings.

19. The method of claim 1 wherein computing personalized statistical parameters for each of one or more users includes adapting the parameters associated with the one or more groups to each of said individuals.

20. The method of claim 1 wherein calculation of the parameters characterizing predicted ratings of items by users includes computing statistical parameters from the history of ratings.

21. The method of claim 20 wherein calculation of the parameters characterizing predicted ratings of items by users further includes computing statistical parameters associated with each of a plurality of variables from the history of ratings.

22. The method of claim 21 wherein computing the statistical parameters includes computing estimated values of at least some of the variables.

23. The method of claim 22 wherein computing the statistical parameters includes computing accuracies of estimated values of at least some of the variables

24. The method of claim 21 wherein computing statistical parameters related to variables includes applying a regression approach.

25. The method of claim 24 wherein applying a regression approach includes applying a linear regression approach.

26. The method of claim 21 wherein computing the statistical parameters related to variables includes applying a risk-adjusted blending approach.

27. The method of claim 1 wherein computing parameters associated with the one or more groups of users includes computing prior probability distributions associated with the personalized statistical parameters for the non-specific users in each of said groups.

28. The method of claim 27 wherein computing the personalized statistical parameters for each of the one or more users includes using the prior probability distribution of the parameters associated with said user's group of users.

29. The method of claim 28 wherein computing the personalized parameters includes computing a posterior probability distribution.

30. The method of claim 29 wherein computing the personalized parameters includes computing a Bayesian estimate of the parameters.

31. The method of claim 1 further comprising:  
accepting additional ratings for one or more items by one or more users; and  
updating the personalized statistics parameters for said user using the additional ratings.
32. The method of claim 31 wherein accepting the additional ratings of items by one or more users includes accepting ratings for items not previously rated by said users.
33. The method of claim 31 wherein accepting the additional ratings of items by one or more users includes accepting updated ratings for items previously rated by said users.
34. The method of claim 31 further comprising eliciting the additional ratings by identifying the one or more items to the user.
35. The method of claim 31 wherein updating the personalized parameters includes computing a Bayesian update of the parameters.
36. The method of claim 31 further comprising recomputing the parameters associated with the one or more cohorts using the additional ratings.
37. The method of claim 36 further comprising recomputing the personalized statistical parameters for each of the one or more users using the recomputed parameters associated with said user's cohort.
38. The method of claim 1 wherein computing the parameters associated with the group of users is regularly repeated.
39. The method of claim 38 wherein computing the parameters associated with the groups of users is repeated weekly.
40. The method of claim 38 wherein computing the personalized parameters is regularly repeated.

41. The method of claim 40 wherein computing the personalized parameters is repeated more frequently than computing the parameters associated with the groups of users.

42. The method of claim 38 wherein computing the personalized parameters includes computing said parameters in response to receiving one or more actual ratings of items from a user.

43. The method of claim 1 wherein maintaining the user-related data further includes storing user preferences.

44. The method of claim 43 wherein storing user preferences includes storing user preferences associated with attributes of the items.

45. The method of claim 43 further comprising accepting user preferences for features of the items.

46. The method of claim 43 wherein accepting said preferences includes eliciting said preferences from the user.

47. The method of claim 46 wherein eliciting the preferences includes accepting answers to a set of questions, each associated with one or more features.

48. The method of claim 43 wherein computing the personalized statistical parameters includes using the users preferences.

49. The method of claim 43 wherein computing parameters associated with the one or more groups of users includes determining a weighting of a contribution of the user preferences in computation of the predicted ratings.

50. The method of claim 43 wherein computing parameters associated with the one or more groups of users includes using the user preferences.

51. The method of claim 50 wherein the parameters associated with the one or more groups of users enable computation of a predicted rating of any of the items by an unspecified user in the cohort with unknown user preferences for said user.

52. The method of claim 1 further comprising requesting ratings from a user for each of a set of selected items, and wherein storing the history of ratings includes storing ratings received from the user in response to the requests in the history.

53. The method of claim 52 further comprising selecting the set of items to requests ratings of based on features of the items.

54. The method of claim 53 wherein selecting the set of items includes using the computed parameters associated with the one or more groups of users.

55. The method of claim 54 wherein selecting the set of items includes selecting said items to increase an expected information related to personalized statistical parameters for the user.

56. The method of claim 1 further comprising computing a personalized recommendation for a user using the parameters characterizing predicted ratings of items for said users.

57. The method of claim 56 wherein computing the personalized recommendation is performed during a user session.

58. The method of claim 56 wherein computing the personalized recommendation is performed off-line prior to a user session.

59. The method of claim 1 further comprising:

computing a score for each of multiple of the items for a first user, including computing predicted ratings for each of said items using the personalized statistical parameters for said user; and

recommending a subset of the multiple items using the computed scores.

60. The method of claim 1 further comprising:
  - computing a score for each of multiple of the items for a set of the users, including
    - computing predicted ratings for each of said items using the personalized statistical parameters for each of the users in said set; and
  - recommending a subset of the multiple items using the computed scores.
61. The method of claim 60 wherein computing the score for each of said items includes combining the predicting ratings for each of the users in the set.
62. The method of claim 61 wherein combining the predicted ratings includes averaging the ratings.
63. The method of claim 62 wherein averaging the predicted ratings includes weighting the contribution of each of the users unequally in the average.
64. The method of claim 61 wherein combining the predicted ratings includes computing a non-linear combination of the ratings.
65. The method of claim 64 wherein computing a non-linear combination of the ratings includes computing an extreme value of the predicted ratings.
66. The method of claim 60 wherein recommending a subset of the multiple items includes determining said subset.
67. The method of claim 66 wherein determining the subset of the items includes excluding items with predicted ratings in a predetermined range for any of the users in the set.
68. The method of claim 67 wherein the predetermined range comprises a range below a predetermined threshold.
69. The method of claim 66 wherein determining the subset of the items includes including items with predicted ratings in a predetermined range for any of the users in the set.

70. The method of claim 66 wherein determining the subset of the items includes including items with a rank in a predetermined range computed using the predicted rating for any of the users in the set.

71. The method of claim 70 wherein the predetermined range of rank consists of the highest rank.

72. The method of claim 1 wherein the personalized statistical parameters further include a quantity that characterizes a distribution of predicted ratings for any of the items by that user and computing the score for each of the multiple items includes combining the predicted rating for the item and said quantity.

73. The method of claim 72 wherein the quantity that characterizes the distribution characterizes an uncertainty in the predicted rating.

74. The method of claim 73 wherein combining the predicted rating and the quantity that characterizes the distribution includes weighting their contribution according to a weight.

75. The method of claim 74 wherein the method further comprises modifying the weight according to a history of recommendations for the user.

76. The method of claim 74 wherein modifying the weight results preferring items for which the predicted ratings have relatively lower certainty.

77. The method of claim 1 wherein one or more of the multiple items is associated with an external preference, and computing the score for each of the multiple items includes combining the predicted rating for the item and said external preference.

78. The method of claim 1 further comprising computing parameters enabling computing of a predicted rating of an item by a user using actual ratings of said item by different users.

79. The method of claim 78 wherein the different users are in the same cohort as the user for whom the predicted rating is computed.

80. The method of claim 1 further comprising computing parameters enabling computing of a predicted rating of an item by a user using an actual rating of different items by a said user.

81. The method of claim 80 further comprising computing a weighting term for a contribution of the actual ratings of the different items by said user.

82. The method of claim 81 further comprising computing the weighting term using the history of ratings.

83. The method of claim 82 wherein computing the weighting term using the history of ratings includes using differences between actual ratings and predicted ratings.

84. A method for identifying similar users comprising:  
maintaining a history of ratings of the items by users in a group of users;  
computing parameters using the history of ratings, said parameters being associated with the group of users and enabling computation of a predicted rating of any of the items by an unspecified user in the group;  
computing personalized statistical parameters for each of one or more individual users in the group using the parameters associated with the group and the history of ratings of the items by that user, said personalized parameters enabling computation of a predicted rating of any of the items by that user;  
identifying similar users to a first user using the computed personalized statistical parameters for the users.

85. The method of claim 84 wherein identifying the similar users includes computing predicted ratings on a set of items for the first user and a set of potentially similar users, and selecting the similar users from the set according to the predicted ratings.

86. The method of claim 84 wherein identifying the similar users includes identifying a social group.

87. The method of claim 86 wherein the social group includes members of a computerized chat room.

88. Software stored on computer readable media comprising instructions for causing a computer system to perform functions comprising:

maintaining user-related data including storing a history of ratings of items by users in one or more groups of users;

computing parameters associated with the one or more groups using the user-related data, including for each of the one or more groups of users computing parameters characterizing predicted ratings of items by users in the group;

computing personalized statistical parameters for each of one or more individual users using the parameters associated with said user's group of users and the stored history of ratings of items by that user;

computing predicted ratings of the items by the each of one or more users using the personalized statistical parameters.

89. Software stored on computer readable media comprising instructions for causing a computer system to perform functions comprising:

maintaining a history of ratings of the items by users in a group of users;

computing parameters using the history of ratings, said parameters being associated with the group of users and enabling computation of a predicted rating of any of the items by an unspecified user in the group;

computing personalized statistical parameters for each of one or more individual users in the group using the parameters associated with the group and the history of ratings of the items by that user, said personalized parameters enabling computation of a predicted rating of any of the items by that user;

identifying similar users to a first user using the computed personalized statistical parameters for the users.